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APPENDIX 30

SYSTEM CONTROLLER - SORTER INTERFACE

FINAL SOFTWARE REPORT

DATA ITEM NO. A005

INTEGRATED ELECTRONIC WARFARE SYSTEM
ADVANCED DEVELOPMENT MODEL (ADM)

78009887-30

PREPARED FOR

NAVAL AIR DEVELOPMENT CENTER
WARMINSTER, PENNSYLVANIA

CONTRACT N62269-75-C-0070

RAYTHEON

**ELECTROMAGNETIC
SYSTEMS DIVISION**

1 OCTOBER 1977

APPENDIX 30

SYSTEM CONTROLLER/SIGNAL SORTER INTERFACE

FINAL SOFTWARE REPORT

DATA ITEM A005

INTEGRATED ELECTRONIC WARFARE SYSTEM (IEWS)
ADVANCED DEVELOPMENT MODEL (ADM)

Contract No. N62269-75-C-0070

Prepared for:

Naval Air Development Center
Warminister, Pennsylvania

Prepared by:

RAYTHEON COMPANY
Electromagnetic Systems Division
6380 Hollister Avenue
Goleta, California 93017

1 OCTOBER 1977

TYPE OF SPEC

INTERFACE CONTROL DOCUMENT

TITLE OF SPEC

SYSTEM CONTROLLER - SORTER ICD

FUNCTION	APPROVED	DATE	FUNCTION	APPROVED	DATE
WRITER	J. Kolanek	7/25/75			

REVISIONS

CHK	DESCRIPTION	REV	CHK	DESCRIPTION	REV
	Complete Revision 1/2/76	1			
	Complete Revision 7/30/76	2			
	See Below 8/5/76	3			

Para. 3.1.2.3C

    Was: (to Sorter)
    Is: (from Sorter)

Para. 3.1.4.2.4

    Change addresses from octal
    representation to hexadecimal.

Table I

    Change addresses from binary
    representation to hexadecimal.

Figure 6

    Add pin numbers.

REVISION																					
SHEET NO.																					
REV STATUS OF SHEETS	REVISION																				
	SHEET NO.																				

SYSTEM CONTROLLER - SORTER
INTERFACE CONTROL DOCUMENT

1.0   SCOPE

This document shall describe the Classification Processor (CP) Bus which provides an interface between the Sorter and the System Controller. The functional as well as the detailed physical requirements shall be included in this document.

2.0   APPLICABLE DOCUMENTS

The following documents, of the latest issue in effect, form a part of this specification to the extent specified herein. In the event of conflict, the requirements of this specification shall govern.

53959-GT-0301	System Controller, ADM, IEWS, Unit Hardware Development Specification.
ESD-SB-001	Signal Sorter, IEWS, Equipment Design and Performance Specification.
CG-893645	IEWS Signal Sorter, Computer Program Performance Specification.

3.0   REQUIREMENTS

3.1   INTERFACE DEFINITION

3.1.1   General

An interface, referred to as the Classification Processor bus, shall be established between the System Controller and the Sorter for the purpose of transferring commands and data between the two units. In addition, provisions shall be made to allow the Special Test Equipment to be connected to this interface for the purpose of monitoring message traffic.

This interface shall be organized as shown in Figure 1, with the three units (the Sorter, System Controller and the Special Test Equipment) interconnected

SYSTEM CONTROLLER

J1

T

50 – TWISTED PAIRS
#22 AWG
$Z_0 = 110 \Omega \pm 5\%$

ITT CANNON TYPE
KJ5E22B35PN
RECEPTACLES

J4

J5

SIGNAL SORTER

18" MAX STUB

$Z_0 = 107 \pm 10 \Omega$

J3

SPECIAL TEST EQUIPMENT

T

T = TERMINATION MODULE
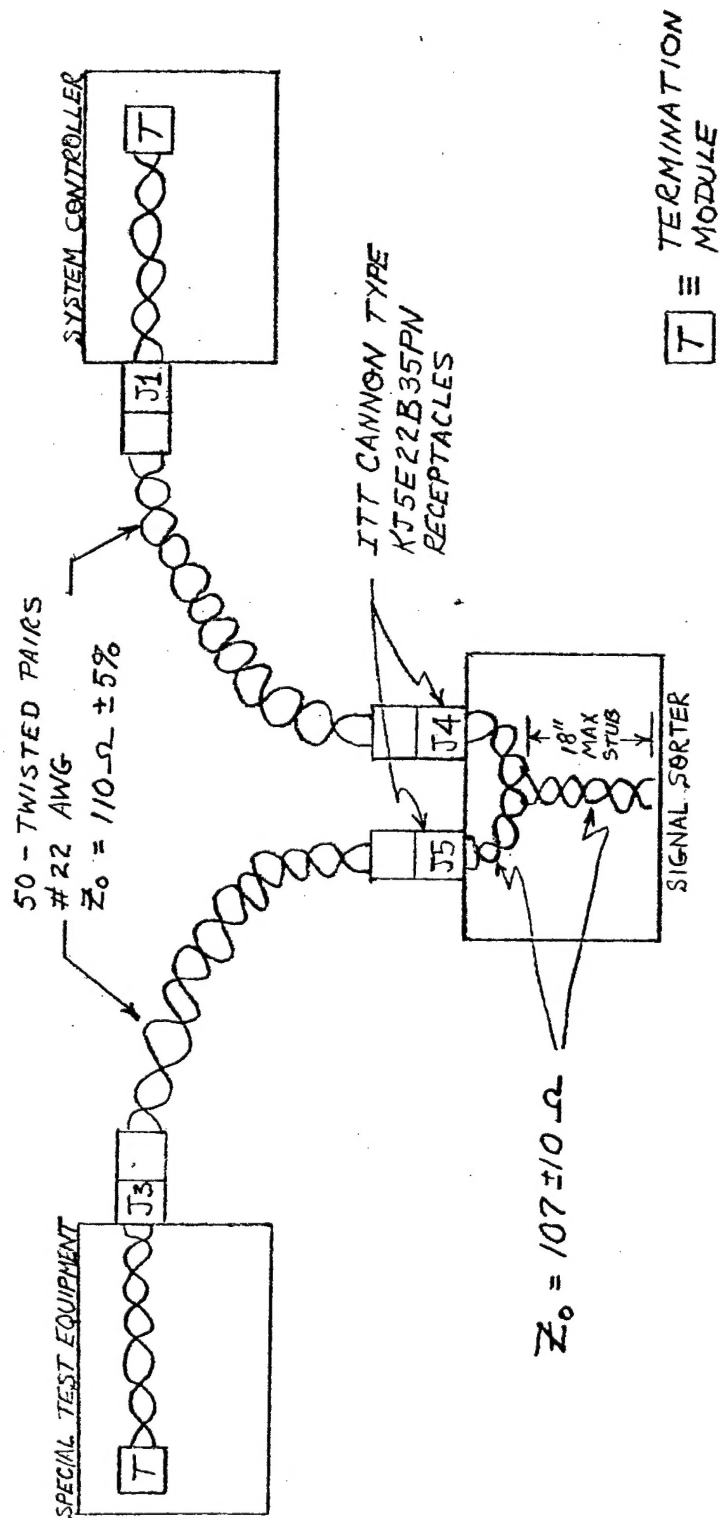
FIGURE 1. SYSTEM CONTROLLER – SIGNAL SORTER INTERFACE

SIZE	CODE IDENT NO	DRAWING NO.
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using an asynchronous bus structure. Bus control shall reside within the System Controller.

3.1.2 **Bus Structure**

The Classification Processor bus shall consist of a RP-16 microprocessor bus structure. This bus shall consist of four sets of lines: address, data, control and interrupt.

3.1.2.1 Address Lines. There shall be sixteen address lines used to identify memory locations within the Sorter which are used to store or retrieve data involved in the information transfer.

3.1.2.2 Data Lines. There shall be sixteen data lines used to transfer data involved in the information transfer.

3.1.2.3 Control Lines. There shall be six control lines used to effect data transfers. These shall consist of the following

    a. read/write (to Sorter)

    b. request (to Sorter)

    c. skip (from Sorter)

    d. acknowledge (from Sorter)

    e. master clear (to Sorter)

    f. power fail (from Sorter)

3.1.2.4 Interrupts. There shall be a single interrupt line used to signal the System Controller that a high priority message transfer is required from the Sorter.

3.1.3 **Bus Control**

Bus control shall reside in the System Controller. Messages shall be considered to be transferred into the Sorter from the System Controller as a

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write operation while messages shall be considered to be transferred from the Sorter to the System Controller as a read operation. The Special Test Equipment shall be a listen-only device capable of monitoring and/or recording all bus messages.

3.1.4   Data Transfer Conventions

Data shall be transferred using one of three approaches:

a. direct memory addressing

b. message block transfer

c. address control

3.1.4.1   Direct Memory Addressing. Direct memory addressing shall consist of directly addressing the memory location involved in the data transfer and employing a read or write operation to effect the data transfer. It is intended that this mode of operation be used primarily for Sorter program load operations.

3.1.4.2   Message Block Transfers. Normal operational command and data transfers shall be made using a message block transfer technique. A message block shall consist of sixteen word units as shown in Figure 2. The block shall be headed by a status word and a command word followed by up to fourteen additional data words. All message blocks shall be transferred using designated message buffer areas within the Sorter and four such areas shall be established.

a. Sorter input low priority buffer

b. Sorter output low priority buffer

c. Sorter output high priority buffer

d. Sorter input high priority buffer

3.1.4.2.1   Status Word. The status word shall consist of two fields, a valid bit and a length field. The valid bit shall be used to indicate valid data is contained within the buffer area. The word length field shall indicate the total number of words that the message block contains including the command word.

WORD   DATA

| 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
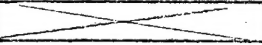
WORD		
0	V	LENGTH
1	OP CODE	DATA
2	DATA	
3	DATA	
4	DATA	
5	DATA	
6	DATA	
7	DATA	
8	DATA	
9	DATA	
10	DATA	
11	DATA	
12	DATA	
13	DATA	
14	DATA	
15	DATA	

FIGURE 2. MESSAGE BLOCK FORMAT

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3.1.4.2.2   Op Code. The most signigicant byte of the second word shall be used to contain an OP CODE. This OP CODE shall identify the message type.

3.1.4.2.3   Low Priority Transfer Procedure. The two message buffers using polling transfer procedures shall have the first word in each buffer designated as a status location. This status word shall be used to control the entry and retreival of messages from the buffer area. The source unit shall access and test the status word to determine when the buffer is empty and ready to accept the next message. The source unit shall wait until the buffer is empty, then enter the message into the buffer area. The last operation shall consist of modifying the status word to indicate that the buffer contains a message ready for transfer. The destination device will periodically test the status word to determine when a message is present. When a message is indicated, the destination device will read the message and its last operation shall consist of modifying the status word indicating that the buffer is available for the next message.

3.1.4.2.4   High Priority Transfer Procedure. The high priority message buffers shall employ an interrupt to initiate urgent message transfers between the Sorter and the System Controller. The status word shall be used to control the entry and retrieval of messages from the buffer area. The sending device (Sorter or System Controller) shall access the status word and test the valid bit to determine if the buffer is empty and ready to accept the next message. The sending device shall wait until the valid bit is zero then enter the message into the buffer area. The next operation shall consist of changing the status word to set the valid bit and indicate the message length. The last operation shall consist of writing to an interrupt generator to interrupt the destination device. The interrupt generators are located as follows:

Interrupt	Address
SC to Sorter	C010 (Hex)
Sorter to SC	C011 (Hex)

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The receiving device shall respond to such interrupts by reading the message block starting with the status word. Reading of the interrupt generator by the receiving device resets the interrupt but the sending device shall not enter a new message until the valid bit has been reset. The receiving device shall reset the valid bit as the last operation in the interrupt message transfer sequence.

3.1.4.3 Special Controls. The System Controller shall exercise certain special control functions over the Sorter by using dual store instruction sequences. A block of sixteen contiguous addresses shall be dedicated for use with these store instruction pairs. Five sequences of two store instructions each shall correspond to five special control functions. Each control function is effected by executing a store instruction pair from the System Controller to the effective address. Any stored data is irrelevant and ignored. Any addressing mode may be used which invokes one of the sixteen dedicated addresses. The functions and associated store instruction addresses are given in Table I.

3.1.4.3.1 Special Control Utilization. Utilization of the five functions is as follows:

1.	STOP	Halts the Sorter Supervisor after the next instruction fetch.
2.	INITALIZE	Resets the Sorter Supervisor internal control register. Includes the STOP function.
3.	START after STOP	Initiates a continuous RUN beginning with the last fetched but unexecuted instruction.
4.	START after INITIALIZE	Initiates a continuous RUN beginning with the instruction at the current value of the Program Counter.
5.	START and NEWSTART (after INITIALIZE)	Initiates a continuous RUN from the address contained in memory location 0.
6.	Single INR	Executes one instruction and halts the Sorter Supervisor after the next instruction fetch.

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TABLE I. Special Control Functions

Special Control Function	First Store Instruction Effective Address (HEX)	Second Store Instruction Effective Address (HEX)
Stop	FF8A	FF8B
Initialize	FF8F	FF8B
Start	FF89	FF8B
Newstart	FF81	FF8B
Single INR	FF88	FF8A

10-2703 (6-72) VELLUM   PRINTED IN U.S.A.

3.2 PERFORMANCE

3.2.1 CP Bus Timing

3.2.1.1 Write Operations. Write operations shall consist of one word transfers using the timing diagram shown in Figure 3.

3.2.1.2 Read Operations. Read operations shall consist of one word transfers using the timing diagram shown in Figure 4.

3.2.2 Low Priority Retrieval Latency

The destination device (Sorter or System Controller) of a message transferred using the polling technique shall accept the message and clear the buffer area on the average of one millisecond after the status word has been set to indicate the presence of a message.

3.3 DATA REQUIREMENTS

3.3.1 System Controller Inputs

The Sorter shall be capable of transferring the messages listed in Table II to the System Controller. The detailed message formats shall be as given in the following descriptions.

10-2703 (6-72) VELLUM   PRINTED IN U.S.A.
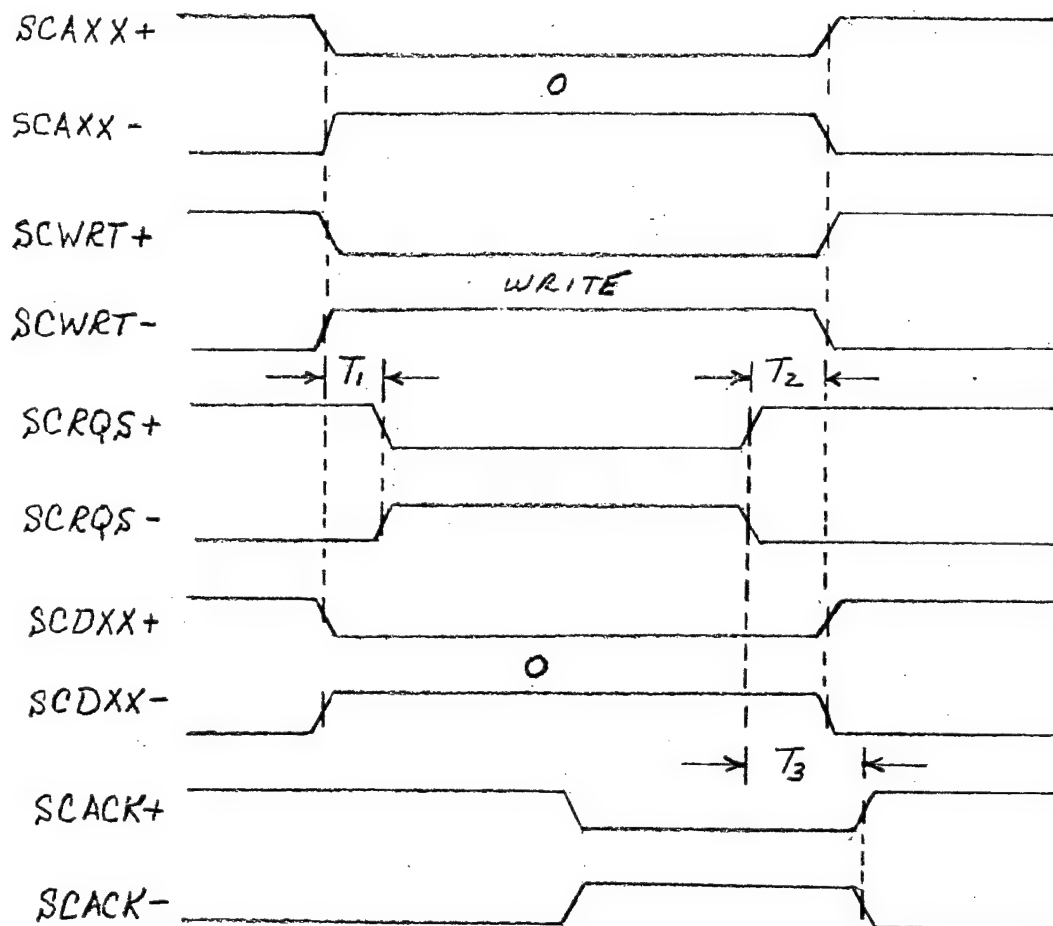
$$T_1 \geq 25, \quad T_2 \geq 25, \quad 75 \geq T_3 \geq 50$$

FIGURE 3. BUS TIMING, WRITE OPERATION

10-2703 (6-72) VELLUM   PRINTED IN U.S.A.
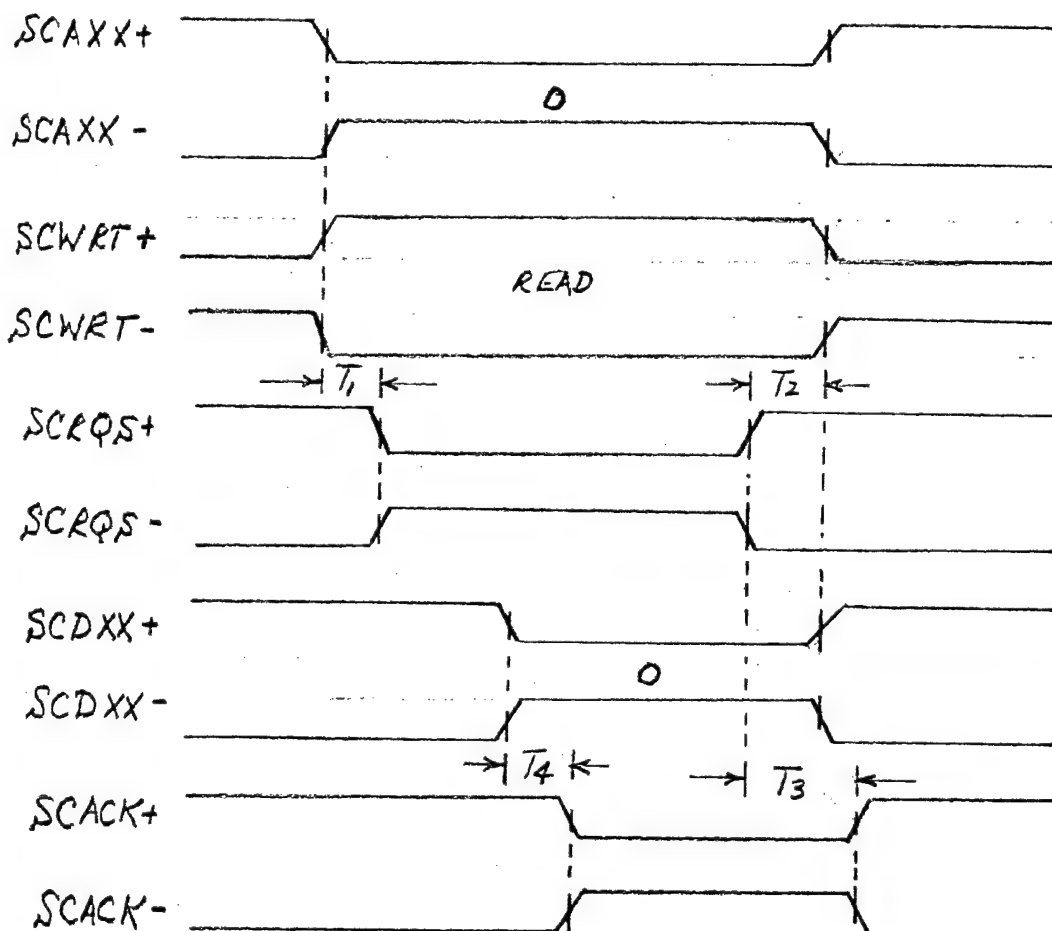
$$T_1 \geq 25, \quad T_2 \geq 25, \quad 75 \geq T_3 \geq 50, \quad T_4 \geq 25$$
(ALL TIMES IN NANOSECONDS)

FIGURE 4. BUS TIMING, READ OPERATION

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CODE IDENT NO. **49956**

SPEC NO. 53959-JK-1002

SHEET 13 OF 61   REV .3

TABLE II. SORTER TO SC MESSAGES

PRIORITY	OP CODE	NAME	FUNCTION
L	80	PTDW	CONTENTS OF TRACK FILE
H	81	NEW EMITTER ALERT	ADVISEC SC OF THE DETECTION OF A NEW EMITTER
L	82	CAM FILE DUMP	INST DUMP OF NESU CAM FILES
L	83	ADA READOUT	COPY NESU ADA FILE TO SC
H	84	THROTTLE ALERT	ALERTS THE SC THAT A THROTTLE FILE HAS BEEN ESTABLISHED
L	85	CONFIRM FILE CREATION	SUPPLIES FILE NUMBER FOR SC CREATED FILE
H	86	ERROR ALERT	AN ERROR HAS BEEN DETECTED BY THE SUPERVISOR
L	87	INACTIVE FILE ALERT	FILE IS NOT RECEIVING UPDATE PDWS
L	88	LONG PULSE PARAMETERS	DATA ON SAMPLED LONG PULSES
L	89	IB<1/4 FULL	INPUT BUFFER IS LESS THAN 1/4 FULL
L	8A	IB>3/4 FULL	INPUT BUFFER GREATER THAN 3/4 FULL
L	8B	FILES FULL	NEW EMITTER DETECTED BUT ALL FILES ARE FULL
H	8C	THROTTLE FILES FULL	ALL 8 PD THROTTLE FILES ARE IN USE
H	8D	BUS HUNG	SUPERVISOR BUS NOT RESPONDING
H	8E	WATCHDOG TIMER	WATCHDOG TIMER NOT RESET
L	8F	ALR-50	ALR-50 BITS DETECTED DURING A SUPERVISOR UPDATE OF FILE
L	90	NPDW MESSAGE	LIST OF PDWS USED TO START A NEW EMITTER FILE
L	91	MEMORY DUMP	TRANSFERS 8 WORDS OF MEMORY FROM THE SORTER SUPERVISOR TO THE SC
L	92	MULTIFREQ FLAGS	MULTIFREQUENCY FLAGS DETECTED IN PDWS DURING SUPERVISOR UPDATE
L	93	BIT STATUS	INITIATE OFF LINE BIT OPERATION

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CODE IDENT NO. 49956

SPEC NO. 53959-JK-1002

SHEET 14 OF 61 — REV 3

MESSAGE NAME - PULSE TRAIN DESCRIPTOR WORD (PTDW)
OPERATION CODE - 80

FUNCTION: TRANSMITS THE CONTENTS OF THE SPECIFIED TRACK FILE TO THE SYSTEM CONTROLLER

FIELD	FUNCTION	UNITS	SCALE
SFN	SORTER FILE NUMBER		
TAZ	TRACK AZIMUTH	CELL	LSB=1
SCHR	TRACK HISTORY REQUEST FROM SC		
NS	TRACKER IN NEW SCAN MODE		
PP	PRI POINTER 0=A,1=B		
LTOA	MS 4 BITS OF LAST TIME OF ARRIVAL	MICROSEC	2^{17}
LTOA	LS 16 BITS OF LTOA	MICROSEC	1
PRIA	EST OF PRI SMALLEST IF DUAL MODE	MICROSEC	1
PRIB	EST OF PRI LARGEST IF DUAL MODE	MICROSEC	1
TF	TRACK FREQUENCY	MHZ	1.25
TT	TEST TRACK FILE FOR BITE		
TCW	IF SET,FILE IS OF CW EMITTER		
TA	IF SET, EMITTER FREQ AGILE		
TV	SET IF FILE CONTAINS VALID DATA		

BIT POSITION

```
15            8 7            0
|   OP CODE 80  |     SFN     |

15   12 11 10              7                  0
|LTOA  | N | N |                              |
|4 MSB | P | P |            TAZ               |
            (S) (S)

15                                            0
|           LTOA (LS 16 BITS)                 |

15 14                                         0
|SCHR| 0 |              PRIA                  |

15                                            0
|  0  0  |              PRIB                  |

15          8 7      4              0
|   TCODE    | TTAMP  |    TPW      |

15   12       8 7     4              0
|TQPRI | TQPW | TQF   |    TQAZ      |

15                                            0
|            TRACK FREQUENCY                  |

15        13       9           4 3 2 1 0
| TCOUNT  |       TPAMP         |T|T|T|T|T|
                                |T|V|C|A|W|
```

MESSAGE NAME— PTDW (CONT)
OPERATION CODE— 80

FIELD	FUNCTION	UNITS	SCALE
TCOUNT	NUMBER OF PDWS REQUESTED BY THE SUPERVISOR		
TPAMP	PEAK DETECTED SIGNAL AMPLITUDE, RESET BY PTDW REQ	DB	1.6 DB
TPW	TRACK PULSE WIDTH	CELL	NONLINEAR
TTAMP	MIN AMPL OF PDW TO BE XFERED ON AUX BUS	DB	3.2 DB
TCODE	DATA INSERTED BY SC		
TQAZ	AZIMUTH QUALITY		.5
TQF	FREQUENCY QUALITY		.5
TQPW	PULSE WIDTH QUALITY		.5
TQPRI	PRI QUALITY		.5

BIT POSITION

15	8	7	0
OP CODE 80		SFN	

15	12 11 10	7	0
LTDA 4 MSB	N/S P/P	TAZ	

15			0
LTDA (LS 16 BITS)			

15 14			0
SCIR 0		PRIA	

15			0
00		PRIB	

15	12	8 7	4	0
TCODE		TTAMP	TPW	

15	12	7	4	0
TQPRI	TQPW	TQF	TQAZ	

15			0
TRACK FREQUENCY			

15	13	9	4 3 2 1 0
	TCOUNT	TPAMP	TTV TTA TTC TTW

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CODE IDENT NO. 49956

SPEC NO. 53959-JK-1002

SHEET 16 OF 61   REV 3

MESSAGE NAME- NEW EMITTER ALERT
OPERATION CODE- 81

FUNCTION   ADVISES SYSTEM CONTROLLER THAT A NEW EMITTER HAS BEEN DETECTED AND GIVES EMITTER PARAMETERS

FIELD	FUNCTION	UNITS	SCALE
SFN	SORTER FILE NUMBER		
TAZ	TRACK AZIMUTH	CELL	LSB=1
SCHR	TRACK HISTORY REQUEST FROM SC		
NS	TRACKER IN NEW SCAN MODE		
PP	PRI POINTER 0=A,1=B		
LTOA	MS 4 BITS OF LAST TIME OF ARRIVAL	MICROSEC	2^{17}
LTOA	LS 16 BITS OF LTOA	MICROSEC	1
PRIA	EST OF PRI SMALLEST IF DUAL MODE	MICROSEC	1
PRIB	EST OF PRI LARGEST IF DUAL MODE	MICROSEC	1
TF	TRACK FREQUENCY	MHZ	1.25
TT	TEST TRACK FILE FOR BITE		
TCW	IF SET,FILE IS OF CW EMITTER		
TA	IF SET, EMITTER FREQ AGILE		
TV	SET IF FILE CONTAINS VALID DATA		

BIT POSITION

15	8	7	0
OP CODE 81		SFN	

15 12	11	10	7	0
LTOA 4 MSB	N S	P P	X	TAZ

15	0
LTOA (LS 16 BITS)	

15 14	0
SCHR 0	PRIA

15	0
00	PRIB

15	8 7	4	0
TCODE	TTAMP	TPW	

15 12	7	4	0
TQPRI	TQPW	TQF	TQAZ

15	0
TRACK FREQUENCY	

15 13	9	4 3 2 1 0
TCOUNT	TPAMP	TTV TTA TCW TWT

MESSAGE NAME- NEW EMITTER ALERT (CONT)
OPERATION CODE- 81

FIELD	FUNCTION	UNITS	SCALE
TCOUNT	NUMBER OF PDWS REQUESTED BY THE SUPERVISOR		
TPAMP	PEAK DETECTED SIGNAL AMPLITUDE. RESET BY PTDW REQ	DB	1.6 DB
TPW	TRACK PULSE WIDTH		
TTAMP	MIN AMPL OF PDW TO BE XFERED ON AUX BUS	DB	3.2 DB
TCODE	DATA INSERTED BY SC	CELL	NONLINEAR
TQAZ	AZIMUTH QUALITY		.5
TQF	FREQUENCY QUALITY		.5
TQPW	PULSE WIDTH QUALITY		.5
TQPRI	PRI QUALITY		.5

BIT POSITION

15 ... 8 7 ... 0

| OP CODE 81 | SFN |

LTOA 4 MSB (bits 12 11 10) | N P / S P | TAZ

LTOA (LS 16 BITS)

PRIA | (bits 15 14) SUIR | 0

PRIB | 00

| 15 ... 8 7 | 4 | 0 |
| TCODE | TTAMP | TPW |

| 15 ... 12 | 7 | 4 | 0 |
| TQPRI | TQPW | TQF | TQAZ |

TRACK FREQUENCY

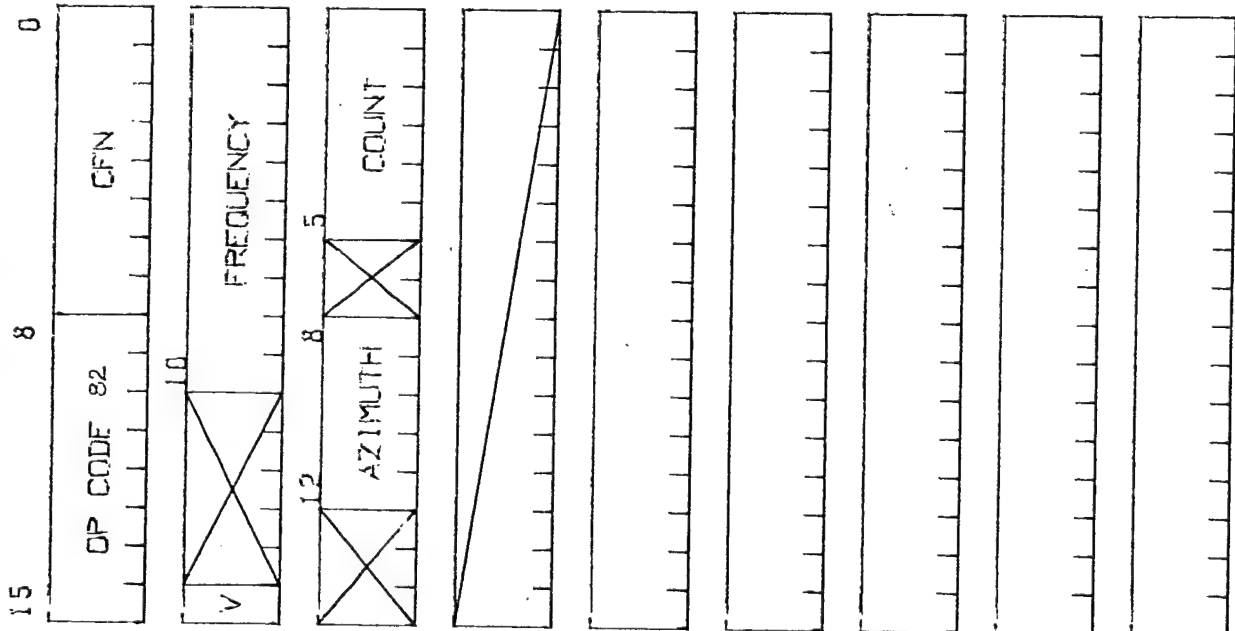| 13 9 | 4 3 2 1 |
| TCOUNT | TPAMP | T T V C / T A C W T |

10-1349 (11/68) PRINTED IN U. S. A.

MESSAGE NAME - CAM FILE DUMP
OP CODE - 82

FUNCTION   INSTRUMENTATION DUMP OF THE NESU CAM FILE.

FIELD	FUNCTION	UNITS	SCALE
CFN	CAM FILE NUMBER		
V	IF SET FILE IS VALID		
FREQ	FILE FREQUENCY (ENCODED)	MHZ	10 MHZ (GRAY)
AZIMUTH	FILE AZIMUTH (ENCODED)	CELLS	2 CELLS (GRAY)
COUNT	NUMBER OF PDWS RECEIVED-PURGED		

BIT POSITION

```
0        8        15
OP CODE 82 | CFN
FREQUENCY
AZIMUTH | COUNT
V
```

MESSAGE NAME- AOA READOUT
OP CODE-   83

FUNCTION- PROVIDES THE SYSTEM CONTROLLER
WITH A COPY OF THE NESU
MULTIPLE MESSAGES REQUIRED
TO SEND COMPLETE FILE

FIELD	FUNCTION	UNITS	SCALE
AOACEL	CELL NUMBER FOR INDICATED AOA COUNT	CELL	LSB=1
AOACNT	NUMBER OF PDWS ACCUMULATED IN CELL	COUNTS	LSB=1

BIT POSITION
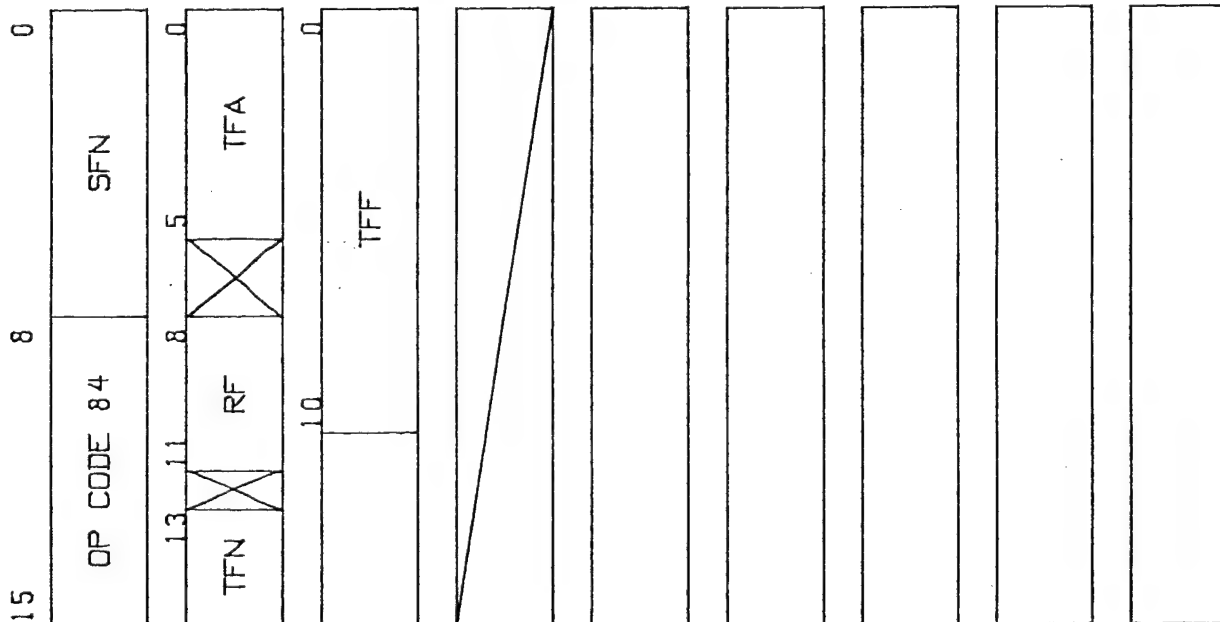
15   8   0

OP CODE 83	AOACEL
AOACNT	

MESSAGE NAME- THROTTLE ALERT
OP CODE - 84

FUNCTION- ADVISES THE SYSTEM CONTROLLER
THAT THE SORTER HAS
ESTABLISHED A THROTTLE FILE AND PROVIDES
THE ASSOCIATED TRACK FILE NUMBER
AND RELATED PARAMETERS

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER		
RF	REDUCTION FACTOR		LSB=1/16
TFA	THROTTLE FILE AZIMUTH	CELLS	1
TFF	THROTTLE FILE FREQ	MHZ	10 MHZ
TFN	THROTTLE FILE NUMBER		

BIT POSITION

15		8			0
OP CODE 84			SFN		
TFN	RF			TFA	
		TFF			

MESSAGE NAME - CONFIRM FILE CREATION

OP CODE - 85

FUNCTION - ADVISES SYSTEM CONTROLLER OF THE FILE
NUMBER ASSIGNED TO AN SC CREATED FILE

FIELD   FUNCTION

SFN   FILE NUMBER

BIT POSITION

15	8	0
OP CODE 85	SFN	

MESSAGE NAME - ERROR ALERT

OP CODE - 86

FUNCTION - ADVISE THE SYSTEM CONTROLLER THAT ONE OF THE FOLLOWING MESSAGES HAVE OCCURED

ERROR CODE	FUNCTION
01	INVALID HI-PRIORITY MESSAGE RECEIVED FROM SC
02	SORTER PURGED NEW EMITTER PDWS BEFORE REQUEST WAS RECEIVED
03	NOT USED
04	INVALID MESSAGE RECEIVED FROM NESU
05	INVALID LO-PRIORITY MESSAGE RECEIVED FROM SC
06	WATCHDOG TIMER EXPIRED, BUT SUPERVISOR SOFTWARE INTACT
07	"DO NOT UPDATE" BIT SET IN EMITTER TABLE FOR NEW EMITTER OR HI DATA RATE THREAT EMITTER
81	AGILE: AOA COUNT ≥ THRESHOLD BUT AZIMUTH SEARCH FINDS NO MATCH
82	AGILE: AOA COUNT ≥ THRESHOLD BUT AZIMUTH SEARCH FINDS ONLY 1 MATCH
83	ILLEGAL SUP. MESSAGE RECEIVED BY NESU
84	NESU RECEIVED HUNG BUS INTERRUPT

BIT POSITION

15		8		0
OP CODE 86			ERROR CODE	

MESSAGE NAME - INACTIVE SORTER FILE

OP CODE - 87

FUNCTION - SPECIFIED FILE HAS NOT BEEN RECEIVING PDWS FOR THE PERIOD OF THE PURGE INTERVAL

FIELD	FUNCTION
SFN	FILE NUMBER

BIT POSITION

15	8	0
OP CODE 87		SFN

10-2703 (6-72) VELLUM   PRINTED IN U.S.A.

MESSAGE NAME- LONG PULSE PARAMETERS
OP CODE- 88

FUNCTION- PROVIDES SORTER'S ESTIMATE OF EMITTER'S ACTUAL (NOT SAMPLING RATE) PARAMETERS

FIELD	FUNCTION	SCALE	UNITS
SFN	FILE NUMBER		
PRIA,PRIB	ESTIMATED PRI	MICROSEC	LSB=1
PW COUNT	AVERAGE NUMBER OF PDW'S PER SAMPLE		

MESSAGE NAME - 1/4 FULL
OP CODE - 89
FUNCTION - INPUT BUFFER < 1/4 FULL

MESSAGE NAME - 3/4 FULL
OP CODE - 8A
FUNCTION - INPUT BUFFER > 3/4 FULL

BIT POSITION

15	8	0
OP CODE 88	SFN	
PRIA		
PRIB		
	PW COUNT (3 0)	
OP CODE 89		
OP CODE 8A		

MESSAGE NAME- NEA/TRACK FILE FULL
OPERATION CODE- 8B

FUNCTION   ADVISES SYSTEM CONTROLLER THAT A NEW EMITTER HAS BEEN DETECTED. PROVIDES EMITTER PARAMETERS, AND WARNS THAT ALL FILES ARE FULL

EMITTER IS NOT TRACKED

	FUNCTION	UNITS	SCALE
TAZ	TRACK AZIMUTH	CELL	LSB=1
SCHR	TRACK HISTORY REQUEST FROM SC		
NS	TRACKER IN NEW SCAN MODE		
PP	PRI POINTER 0=A,1=B		
LTDA	MS 4 BITS OF LAST TIME OF ARRIVAL	MICROSEC	2^{17}
LTDA	LS 16 BITS OF LTDA	MICROSEC	1
PRIA	EST OF PRI SMALLEST IF DUAL MODE		
PRIB	EST OF PRI LARGEST IF DUAL MODE	MICROSEC	1
TF	TRACK FREQUENCY	MHZ	1.25
TT	TEST TRACK FILE FOR BITE		
TCW	IF SET,FILE IS OF CW EMITTER		
TA	IF SET, EMITTER FREQ AGILE		
TV	SET IF FILE CONTAINS VALID DATA		

BIT POSITION

15	8	7	0
⊠		OP CODE 8B	

| 15 | 12 11 10 | 7 | 0 |
| LTDA 4 MSB | N S P P | TAZ | ⊠ |

| 15 | | | 0 |
| LTDA (LS 16 BITS) | | | |

| 15 14 | | | 0 |
| SCHR 0 | | PRIA | |

| 15 | | 00 | 0 |
| | | PRIB | |

| 15 | 8 7 | 4 | 0 |
| TCODE | TTAMP | TPW | |

| 15 | 12 | 7 | 4 | 0 |
| TQPRI | TQPW | TQF | TQAZ | |

| 15 | | | 0 |
| TRACK FREQUENCY | | | |

| 15 | 13 | 9 | 4 3 2 1 0 |
| ⊠ | TCOUNT | TPAMP | TT TV TC TW |

MESSAGE NAME- NEA/TRACK FILES FULL (CONT)
OPERATION CODE- 8B

FIELD	FUNCTION	UNITS	SCALE
TCOUNT	NUMBER OF PDWS REQUESTED BY THE SUPERVISOR		
TPAMP	PEAK DETECTED SIGNAL AMPLITUDE. RESET BY PTDW REQ	DB	1.6 DB
TPW	TRACK PULSE WIDTH	CELL	NONLINEAR
TTAMP	MIN AMPL OF PDW TO BE XFERED ON AUX BUS	DB	3.2 DB
TCODE	DATA INSERTED BY SC		
TQAZ	AZIMUTH QUALITY		.5
TQF	FREQUENCY QUALITY		.5
TQPW	PULSE WIDTH QUALITY		.5
TQPRI	PRI QUALITY		.5

BIT POSITION

15	8	7	0
OP CODE 8B		(X)	

| 15 | 12 11 10 | 7 | 0 |
| LTDA 4 MSB | N P S P | (X) | TAZ |

| 15 | | | 0 |
| LTDA (LS 16 BITS) | | | |

| 15 14 | | | 0 |
| SCIR 0 | PRIA | | |

| 15 | | | 0 |
| 00 | PRIB | | |

| 15 | 12 | 8 7 | 4 | 0 |
| TCODE | | TTAMP | TPW | |

| 15 | 12 | 8 7 | 4 | 0 |
| TQPRI | TQPW | TQF | TQAZ | |

| 15 | | | 0 |
| TRACK FREQUENCY | | | |

| 15 | 13 | 9 | 4 3 2 1 0 |
| (X) | TCOUNT | TPAMP | T T T T T P V C W A T |

BIT POSITION

| 15 | | 8 | | 0 |

THROT, FULL OPCODE 8C	✕
BUS HUNG OP CODE 8D	✕
WATCHDOG OP CODE 8E	✕
ALR-50 OP CODE 8F	SFN

MESSAGE NAME-AS NOTED
OP CODE- AS NOTED

NOTE SFN =FILE NUMBER

MESSAGE	FUNCTION
THR FILES FULL	ALL 8 THROTTLE FILES ARE FULL
BUS HUNG	SUPERVISOR BUS NOT RESPONDING
WATCHDOG	WATCHDOG TIMER NOT RESET WITHIN SPECIFIED TIME INTERVAL
ALR-50	ALR-50 BITS ARE SET AT UPDATE TIME
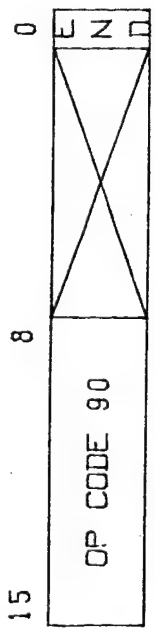
MESSAGE NAME - NPDW MESSAGE

OP CODE - 90

FUNCTION - LIST OF PDWS USED TO START TRACK FILE

FIELD FUNCTION

END WHEN SET, INDICATES LAST NPDW MESSAGE FROM PRESENT REQUEST

BIT POSITION

0	8	15
E N D		OP CODE 90

STANDARD FORMAT FOR PDWS

4 16 BIT WORDS

10-1349 (11/68) PRINTED IN U. S. A.

MESSAGE NAME - MEMORY DUMP

OP CODE - 91

FUNCTION   IN RESPONSE TO SYSTEM CONTROLLER
REQ. TRANSFERS 8 WORDS
OF SORTER MEMORY TO
THE CONTROLLER

BIT POSITION
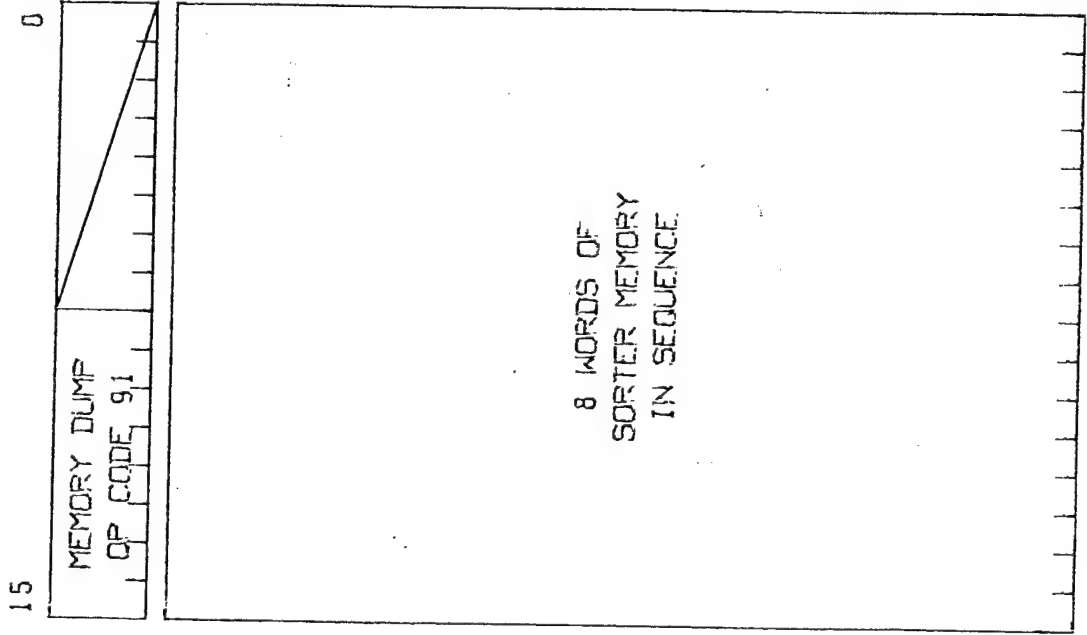
0 15

MEMORY DUMP
OP CODE 91

8 WORDS OF
SORTER MEMORY
IN SEQUENCE.

10-1349 (11/68)   PRINTED IN U. S. A.

MESSAGE NAME- MULTIFREQUENCY FLAGS

OPERATION CODE- 92

FUNCTION- ADVISES SC THAT THE SOFTWARE UPDATE HAS DETECTED N MULTIFREQ FLAGS SET IN THE UPDATE SET OF PDWS

FIELD   FUNCTION

SFN   SORTER FILE NUMBER

BIT POSITION

15		0
OP CODE 92		SFN

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MESSAGE NAME - BIT STATUS MESSAGE

OP CODE - 93

FUNCTION - REPORT BIT STATUS IN RESPONSE TO A REQUEST FROM THE SYSTEM CONTROLLER

FIELD	FUNCTION
PFI	PASS/FAIL INDICATOR
BEC	BIT ERROR CODE (SEE SPEC.)
EFN	FILE NUMBER IN ERROR
TN	TEST NUMBER
TTP	TEST TABLE POINTER
ADTA	ACTUAL DATA
EDTA	EXPECTED DATA
INDX	INDEX (IF APPLICABLE)
LCOM	LAST COMMAND ISSUED TO UNIT
CNTRL	CONTROL STATUS WORD
INTR	INTERRUPT STATUS WORD

BIT POSITION 0 ... 15

OP CODE 93   P F   BEC
EFN
TN
TTP
ADTA
EDTA
INDX
LCOM
CNTRL
INTR

3.3.2   System Controller Outputs

     The System Controller shall be capable of transferring the messages listed in Table III to the Sorter. The detailed message formats shall be as given in the following descriptions.

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TABLE III. SC TO SORTER MESSAGES

PRIORITY	OP CODE	NAME	FUNCTION
H	01	SORTER START	SORTER GOES FROM IDLE TO RUN MODE
H	02	PAUSE	GO TO IDLE MODE
H	03	INITIALIZE	INITIALIZE ALL SORTER PARAMETERS
H	04	INIT/START NESU	CLEAR NESU BUFFER FILES AND START SEARCH
L	05	CAM FILE DUMP	TX NESU CAM FILE DATA TO SC
L	06	AOA READOUT REQUEST	REQUESTS THAT NESU AOA FILE BE TX TO SC
L	07	FILE DUMP	DUMP ALL TRACK FILES TO THE SC
L	08	UPDW REQUEST	SEND ALL UPDWS TO THE SC VIA THE AUX BUS
L	09	SYNTHETIC PDW	INJECT SYNTHETIC PDW INTO THE INPUT BUFFER
L	0A	NESU THRESHOLD	CHANGE NUMBER OF PDWS REQUIRED TO START A NEW EMITTER
L	0B	QUAL BIT MODIF.	CHANGE THE QUALITY BITS ON ALL PARAMETERS
L	0C	TRACK PRIORITY MODIFY	CHANGE PURGE.UPDATE TIME. AND PRIORITY
L	0D	PTDW REQ.	REQUEST PTDW ON SPECIFIED FILE
L	0E	SPDW REQ	REQUEST TRANSFER OF SPDWS ON THE AUX BUS
L	0F	STOP SPDWS	STOP TRANSFER OF SPDWS FOR THE SPEC FILE NUMBER
L	10	NEPDW REQ	TRANSFER ALL PDWS USED TO START A FILE TO THE SC
L	11	DELETE FILE	COMMAND SORTER TO DROP A TRACK FILE
L	12	FREQ MOD	CHANGE TRACK FREQUENCY
L	13	PRI MOD	" " PRIS
L	14	THROTTLE FILE MOD	MODIFY EXISTING THROTTLE FILE DATA
L	15	AOA THRESHOLD MOD.	CHANGE NUMBER OF PDWS REQUIRED TO TRIGGER AN AGILE EMITTER SEARCH
L	16	CREATE FILE	ALLOWS THE SC TO GENERATE A SYNTHETIC FILE
L	17	STOP UPDWS	STOP TRANSFER OF UPDWS ON THE AUX BUS
L	18	PW MOD	CHANGE TRACK PW
L	19	TRANSFER TABLE	REQUESTS SORTER SUPERVISOR TO SEND MEMORY CONTENTS TO SC.
L	1A	MODIFY ADDRESS	ALLOWS SC TO CHANGE SORTER MEMORY CONTENTS
H	1B	PAUSE NESU	PUT THE NESU IN IDLE MODE
L	1C	BIT REQ	REQUESTS EXEC OF BIT TESTING OFF-LINE

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MESSAGE NAME - COMMAND MESSAGES

OP CODES - AS NOTED

COMMAND	FUNCTION
START	TRANSFER SORTER FROM PAUSE TO SORT MODE
PAUSE	PLACES SORTER IN AN IDLE LOOP, SORTER RESP. ONLY TO SC LOW PRIORITY MESSAGES
INITIALIZE	SET INIT PARAMS ENTER IDLE LOOP
INIT/START NESU	CLEAR CAM FILES, START SEARCH FOR NEW EMITTERS
CAM FILE DUMP	DUMP NESU CAM FILES TO SC
AOA READOUT REQUEST	DUMP AOA FREQ AGILE TRAP TO THE SC
FILE DUMP REQUEST	DUMP ALL TRACK FILES TO SC

BIT POSITION

0   8   7   15

SORTER START   OP CODE 01

PAUSE   OP CODE 02

INITIALIZE   OP CODE 03

I/S NESU   OP CODE 04

CAM DUMP   OP CODE 05

AOA READOUT   OP CODE 06

FILE DUMP   OP CODE 07
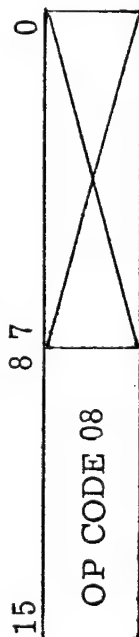
MESSAGE NAME - UPDW REQ

OP CODE - 08

FUNCTION - REQ ALL UNASSOCIATED PDWS BE SENT TO
TO THE SC VIA THE AUX BUS

BIT POSITION

0		8 7		15
				OP CODE 08

SIZE	CODE IDENT NO.	DRAWING NO.
A	49956	53959-JK-1002
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MESSAGE NAME - SYNTHETIC PDW

OP CODE - 09

FUNCTION - INJECTS SYNTHETIC PDWS
AS SPECIFIED BY STD. PDW
INTO THE INPUT BUFFER

BIT POSITION
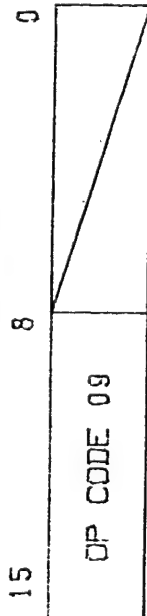
0

8

15

OP CODE 09

STANDARD PDW TEXT

MESSAGE NAME - NESU TRACK THRESHOLD
OP CODE - 0A

FUNCTION - CHANGE NUMBER OF PDWS
THAT MUST BE RECEIVED
TO START A NON-FREQ AGILE
TRACK FILE

FIELD	FUNCTION	UNITS	SCALE
NESUST	DEFINES NR OF PDWS REQD TO START TRACK		

BIT POSITION

15	8	7	0
OP CODE 0A		NESUST	
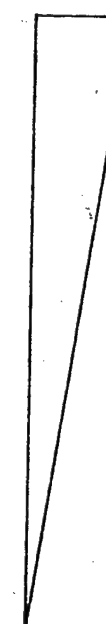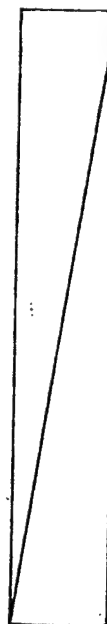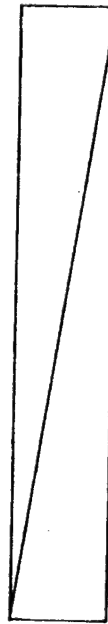
10-1349 (11/68)   PRINTED IN U. S. A.

MESSAGE NAME - QUALITY BIT MODIFICATION

OP CODE - 0B

FUNCTION - CHANGE THE PARAMETER QUALITY BITS FOR A GIVEN TRACK. ALL QUAL BITS ARE CHANGED TO THOSE INDICATED

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER		
TQAZ	AZIMUTH WEIGHT		LSB=1/2
TQF	FREQ WEIGHT		LSB=1/2
TQPW	PW WEIGHT		LSB=1/2
TQPRI	PRI WEIGHT		LSB=1/2

BIT POSITION

```
15        8 7        0
| OP CODE 0B | SFN    |

 15    12    8    4    0
| TQPRI | TQPW | TQF | TQAZ |
```

MESSAGE NAME - TRACK PRIORITY MODIFY

OP CODE - 0C

FUNCTION - MODIFIES EMITTER PURGE TIME, UPDATE CYCLE TIME, AND SETS OR CLEARS THE FILES INACTIVE BIT ALL UPDATES OF VALID FILES MUST HAVE MSB OF WORD 1 SET

FIELD	FUNCTION	UNITS	SCALE
SFN J	FILE NUMBER (DON'T CARE)		
P	INDICATES TOP PRIORITY 1 SEC UPDATE		
	IF=1, UPDATE EVERY 2 SEC		
	IF=0, UPDATE EVERY 4 SEC		
I*	IF=1, FILE HAS PASSED PURGE TIME WITHOUT ANY NEW PDWS		
PURGE	MAX TIME INTERVAL DURING WHICH NEW DATA MUST BE RECEIVED OR INACTIVE FILE MSG IS TRANSMITTED AFFECTS ALL TRACK FILES	SECONDS	50 MSEC

* NOT LOOKED AT BY SORTER

BIT POSITION

15		0
OP CODE 0C		SFN

15	14	13	12	11		0
I	J	P	I		PURGE	

MESSAGE NAME – PTDW REQUEST

OP-CODE – 0D

FUNCTION – REQUEST BY THE SC THAT THE SPECIFIED TRACK FILE BE TRANSMITTED TO THE SC.

FIELD	FUNCTION	UNITS	SCALE
SFN	TRACK FILE NUMBER		

BIT POSITION

0

15

OP CODE 0D	SFN

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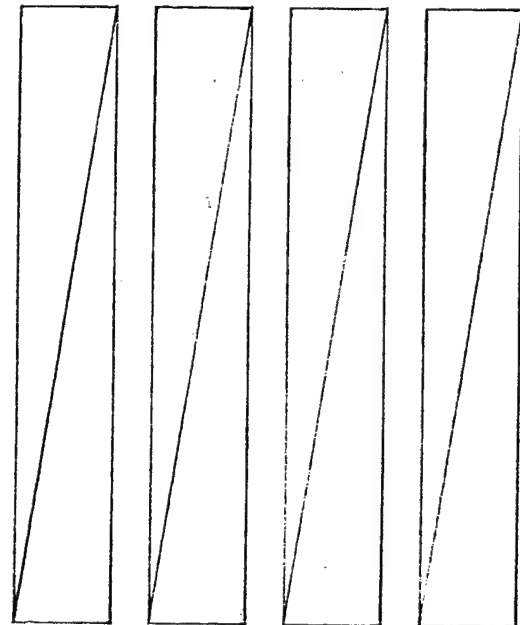SPEC NO. 53959-JK-1002

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MESSAGE NAME - SPDW REQUEST

OP CODE - 0E

FUNCTION - REQUESTS SORTER TO TRANSFER SPDWS OF IND. FILE ON THE AUX BUS

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER		
TTAMP	DEFINES AMPL. LEVEL ABOVE WHICH PDWS WILL BE XFERED ON THE AUX BUS	DBM	3.2
TCODE	SC GENERATED CODE FOR USE BY THE ATOA AND TG UNITS		

BIT POSITION 0 15

OP CODE 0E	SFN
TTAMP	TCODE

MESSAGE NAME - SPDW STOP

OP CODE - 0F

FUNCTION - STOP XFER OF SPDWS FROM THE SPECIFIED FILE

FIELD	FUNCTION
SFN	FILE NUMBER

UNITS	SCALE

BIT POSITION

0									
SFN									
OP CODE 0F									
15									

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MESSAGE NAME - NEPDW REQUEST

OP CODE - 10

FUNCTION - REQ THAT PDWS USED TO
START SPEC. FILE
BE XFERED TO THE
SC. (INSTRUMENTATION)

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER		

BIT POSITION

0									
SFN									
OP CODE 10									

15

MESSAGE NAME - DELETE TRACK FILE

OP CODE - 11

FUNCTION - COMMANDS SORTER TO DELETE THE SPEC TRACK FILE

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER		

BIT POSITION

0								
SFN								
OPCODE 11								
15								

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MESSAGE NAME - FREQUENCY MODIFICATION

OP CODE - 12

FUNCTION - CHANGE SORTER ESTIMATE
OF THE EMITTER FREQUENCY

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER		
MODF	VALUE TO REPLACE SORTER FREQ EST	MHZ	1.25

BIT POSITION

15	8	7	0
OPCODE 12		SFN	
MODF			

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3

MESSAGE NAME - PRI MODIFICATION

OP CODE - 13

FUNCTION - CHANGES THE VALUES OF PRIA
AND PRIB IN THE
SPECIFIED TRACK FILE

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER		
MODPRIA	NEW PRI VALUE	SECONDS	1 MICROSEC.
MODPRIB	NEW PRI VALUE	SECONDS	1 MICROSEC.

BIT POSITION

0

15

OPCODE 13	SFN
MODPRIA	
MODPRIB	

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SPEC NO. 53959-JK-1002

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MESSAGE NAME - THROTTLE FILE MODIFICATION

OP CODE - 14

FUNCTION - REPLACE EXISTING THROTTLE FILE DATA WITH THAT IN MESSAGE

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE ASSOCIATED WITH THROTTLE FILE		
RF	THROTTLE REDUCTION FACTOR		LSB=16
TFA	THROTTLE FILE AZIMUTH	CELLS	1
TFF	THROTTLE FILE FREQUENCY	MHZ	10
TFN	NUMBER OF THROTTLE FILE TO BE MODIFIED		

BIT POSITION
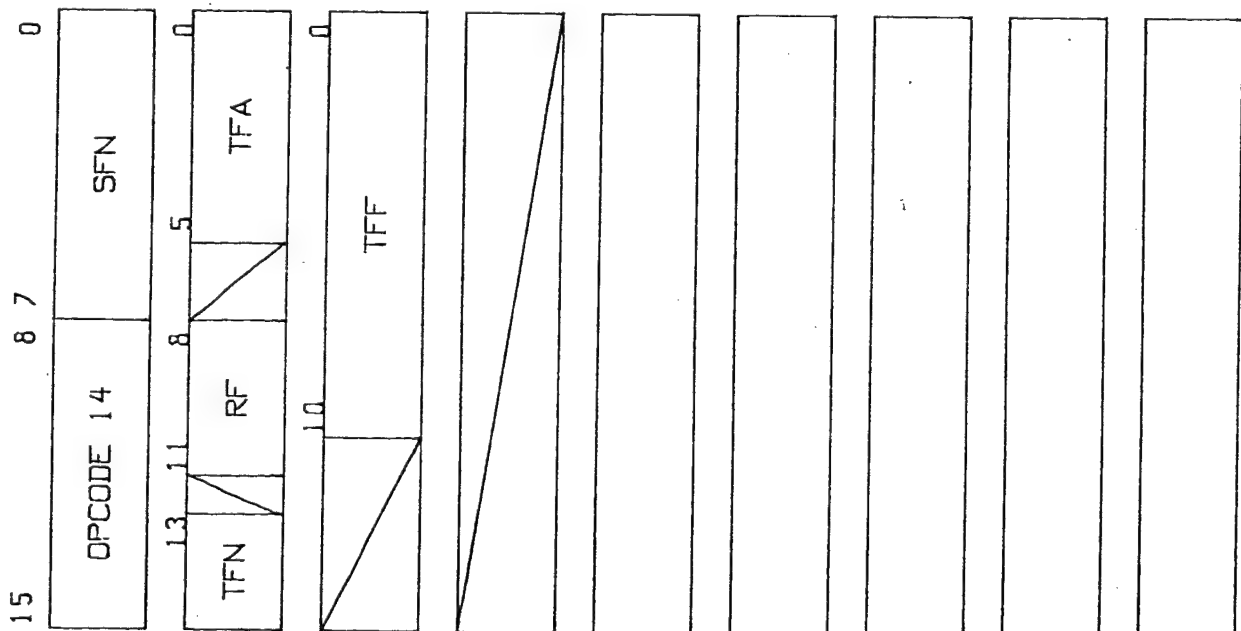
OPCODE 14 — SFN

TFN — RF — TFA

TFF

MESSAGE NAME - AOA THRESHOLD MODIFICATION

OP CODE - 15

FUNCTION - CHANGE NUMBER OF PDWS REQUIRED
TO START AN AGILE FILE

FIELD	FUNCTION	UNITS	SCALE
AZCNT	NUMBER OF PDWS REQUIRED TO START NEW EMITTER ANALYSIS PROCESS		

BIT POSITION

15	8	7	0
OPCODE 15		AZCNT	

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MESSAGE NAME- CREATE TRACK FILE
OPERATION CODE- 16

FUNCTION   PROVIDES SORTER WITH FORMATTED TRACK FILE GENERATED BY SC

	FUNCTION	UNITS	SCALE
TAZ	TRACK AZIMUTH	CELL	LSB=1
SCHR	TRACK HISTORY REQUEST FROM SC		
NS	TRACKER IN NEW SCAN MODE		
PP	PRI POINTER 0=A,1=B		
LTOA	MS 4 BITS OF LAST TIME OF ARRIVAL	MICROSEC	2^{17}
LTOA	LS 16 BITS OF LTOA		
PRIA	EST OF PRI SMALLEST IF DUAL MODE	MICROSEC	1
PRIB	EST OF PRI LARGEST IF DUAL MODE	MICROSEC	1
TF	TRACK FREQUENCY	MHZ	1.25
TT	TEST TRACK FILE FOR BITE		
TCW	IF SET,FILE IS OF CW EMITTER		
TA	IF SET, EMITTER FREQ AGILE		
TV	SET IF FILE CONTAINS VALID DATA		

BIT POSITION

15	8	7	0
	OP CODE	✕	

15	12 11 10	7	0
LTOA 4 MSB	N P / S P	✕	TAZ

15			0
	LTOA (LS 16 BITS)		

15 14			0
SC IR / 0		PRIA	

15			0
00		PRIB	

15	12	8 7	4	0
TCODE		TTAMP	TPW	

15		7	4	0
TQPRI	TQPW	TQF	TQAZ	

15	9			0
		TRACK FREQUENCY		

13	9	4 3 2 1 0
✕	TCOUNT	TPAMP	T T T T T / V A C W T

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MESSAGE NAME- CREATE TRACK FILE (CONT)
OPERATION CODE- 16

FIELD	FUNCTION	UNITS	SCALE
TCOUNT	NUMBER OF PDWS REQUESTED BY THE SUPERVISOR		
TPAMP	PEAK DETECTED SIGNAL AMPLITUDE, RESET BY P'TDW REQ	DB	1.6 DB
TPW	TRACK PULSE WIDTH	CELL	NONLINEAR
TTAMP	MIN AMPL OF PDW TO BE XFERED ON AUX BUS	DB	3.2 DB
TCODE	DATA INSERTED BY SC		
TQAZ	AZIMUTH QUALITY		.5
TQF	FREQUENCY QUALITY		.5
TQPW	PULSE WIDTH QUALITY		.5
TQPRi	PRI QUALITY		.5

BIT POSITION

MESSAGE NAME - UPDW STOP
OP CODE - 17

FUNCTION - STOP TRANSFER OF UPDWS FROM THE
SORTER TO SC

BIT POSITION

15	8 7	0
OP CODE 17		

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MESSAGE NAME - PULSE WIDTH MODIFICATION

OP CODE - 18

FUNCTION - REPLACE EXISTING ESTIMATE OF PULSE WIDTH WITH VALUE SPEC.

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER	CELLS	1
MODPW	MODIFIED PULSE WIDTH VALUE		

BIT POSITION

15	8 7	0
OPCODE 18	SFN	

3	0
	MODPW

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MESSAGE NAME- TRANSFER TABLE

OP CODE - 19

FUNCTION- ALLOWS SYSTEM CONTROLLER TO EXAMINE
INSTRUCTIONS AND
DATA IN THE SORTER MEMORY
8 WORDS ARE TRANSFERED IN RESPONSE

BIT POSITION

0

15

OP CODE 19

START ADDRESS
IN SORTER SPECTRUM

MESSAGE NAME- MODIFY MEMORY ADDRESS

OP CODE- 1A

FUNCTION- ALLOWS THE SYSTEM MANAGER TO
CHANGE INSTRUCTIONS OR DATA
IN THE SORTER MEMORY

BIT POSITION

OP CODE 1A

ADDRESS OF WORD
TO BE MODIFIED

DATA TO REPLACE OLD WORD

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BIT POSITION

0		8 7		15

MESSAGE NAME - AS NOTED
OPERATION CODES - AS NOTED

COMMAND	FUNCTION
PAUSE NESU	PLACE NESU IN IDLE LOOP
BIT REQ	REQUEST INITIATION OF THE BIT TEST (THIS IS AN OFF LINE FUNCTION)

PAUSE NESU
OP CODE 1B

BIT REQ
OP CODE 1C

3.3.3   Program Load
         (TBD)

3.4   DESIGN REQUIREMENTS

3.4.1   Line Drivers/Line Receivers
         All line drivers and line receivers shall incorporate SN75110 and
SN75107A type devices respectively. The CP bus shall be terminated on both
ends with the termination network specified in Figure 5.

3.4.2   Interconnecting Transmission Lines
         All interconnecting cables used for this interface shall utilize twisted
pair. The characteristic impedance shall be $110\Omega \pm 5\%$. Twisted pair within the
signal sorter shall have characteristic impedance of $107\Omega \pm 10\Omega$ with a maximum
stub length of 18 inches. A termination shall be provided which has a matched
pair ($\pm 1\%$) of 56 ohm resistors for each signal and its return as shown in Figure 5.
The optional biasing network shall be used to bias interface lines in the absence
of drivers.

3.4.3   Interface Signal Definition
         Figure 6 gives the interface signals between the System Controller
and the Sorter. Signals SCD00 + and SCD00 - are the signal and return
respectively for the least significant data bit. SCD15 is the most signigicant bit.
SCA00 through SCA15 are the least significant through most significant address
bits respectively. The remaining signals are:

Signal	Definition
SCWRT	Write/Read
SCRQS	Request
SCACK	Acknowledge
SCSKP	Skip
SCMCL	Master Clear

SIZE	CODE IDENT NO.	DRAWING NO.		
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SCALE		REV 3	SHEET 56 of 61	

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TERMINATION NETWORK

OPTIONAL
BIASING NETWORK

SIGNAL +

SIGNAL -

MATCHED
TO
±1%

56Ω

56Ω

−5V

56KΩ

3.6KΩ

3.6KΩ

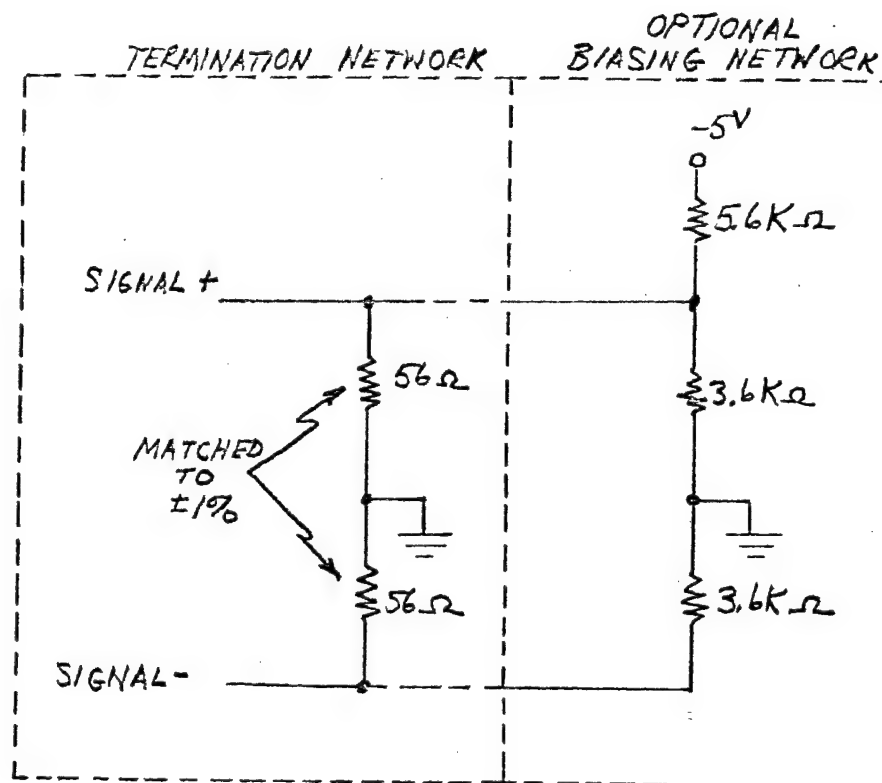FIGURE 5. SYSTEM CONTROLLER & SPECIAL TEST EQUIPMENT TERMINATION & OPTIONAL BIASING NETWORKS

SIZE	CODE IDENT NO	DRAWING NO.	
A	49956	53959-JK-1002	
SCALE		REV 3	SHEET 57 of 61

J1 IN System Controller	PIN #'s		PIN #'s	J4 & J5 IN Signal Sorter
	1	SCD00+	1	LSB
	2	SCD00-	2	
	13	SCD01+	13	
	14	SCD01-	14	
	35	SCD02+	35	
	36	SCD02-	36	
	37	SCD03+	37	
	38	SCD03-	38	
	11	SCD04+	11	
	12	SCD04-	12	
	5	SCD05+	5	
	6	SCD05-	6	
	33	SCD06+	33	
	34	SCD06-	34	
	7	SCD07+	7	
	15	SCD07-	15	DATA
	31	SCD08+	31	
	32	SCD08-	32	
	17	SCD09+	17	
	18	SCD09-	18	
	8	SCD10+	8	
	16	SCD10-	16	
	29	SCD11+	29	
	30	SCD11-	30	
	69	SCD12+	69	
	70	SCD12-	70	
	71	SCD13+	71	
	72	SCD13-	72	
	94	SCD14+	94	
	95	SCD14-	95	
	86	SCD15+	86	
	87	SCD15-	87	MSB

(CONTINUED ON NEXT PAGE)

FIGURE 6. INTERFACE SIGNAL LIST

SIZE	CODE IDENT NO	DRAWING NO.
A	49956	53959-JK-1002
SCALE	REV 3	SHEET 58 of 61

J1 IN SYSTEM CONTROLLER   (CONTINUED FROM PRECEDING PAGE)   J4 & J5 IN SIGNAL SORTER

PIN # (J1)	Signal	PIN # (J4 & J5)	
67	SCA00 +	67	LSB
68	SCA00 -	68	
62	SCA01 +	62	
63	SCA01 -	63	
81	SCA02 +	81	
82	SCA02 -	82	
60	SCA03 +	60	
61	SCA03 -	61	
75	SCA04 +	75	
76	SCA04 -	76	
77	SCA05 +	77	
78	SCA05 -	78	
48	SCA06 +	48	ADDRESS
49	SCA06 -	49	
46	SCA07 +	46	
47	SCA07 -	47	
92	SCA08 +	92	
100	SCA08 -	100	
88	SCA09 +	88	
89	SCA09 -	89	
79	SCA10 +	79	
80	SCA10 -	80	
90	SCA11 +	90	
91	SCA11 -	91	
23	SCA12 +	23	
24	SCA12 -	24	
52	SCA13 +	52	
53	SCA13 -	53	
45	SCA14 +	45	
66	SCA14 -	66	
41	SCA15 +	41	
42	SCA15 -	42	MSB

FIGURE 6 (CONT.) INTERFACE SIGNAL LIST

SIZE	CODE IDENT NO	DRAWING NO.	
A	49956	53959-JK-1002	
SCALE		REV 3	SHEET 59 of 61

10-2703 (6-72) VELLUM   PRINTED IN U.S.A.

PIN		PIN
58	SCWRT +	58
59	SCWRT –	59
85	SCRQS +	85
93	SCRQS –	93
83	SCACK +	83
84	SCACK –	84
64	SCSKP +	64
65	SCSKP –	65
43	SCPFL +	43
44	SCPFL –	44
50	SCMCL +	50
51	SCMCL –	51
39	SCRPI +	39
40	SCRPI –	40
54	PANIC +	54
55	PANIC –	55
9	SPARE	9
10	SPARE	10
19	SPARE	19
20	SPARE	20
21	SPARE	21
22	SPARE	22
27	SPARE	27
28	SPARE	28
56	SPARE	56
57	SPARE	57
73	SPARE	73
74	SPARE	74
96	SPARE	96
97	SPARE	97
98	SPARE	98
99	SPARE	99
3	SPARE	3
4	SPARE	4
(No Conn)	SC5VR (Used in sorter only)	25
(No Conn)	SC5VR (Used in Sorter only)	26

FIGURE 6 (CONTINUED).
INTERFACE SIGNAL LIST

SIZE	CODE IDENT NO	DRAWING NO.
A	49956	53959-JK-1002
SCALE	REV 3	SHEET 60 of 61

10-2703 (6-72) VELLUM   PRINTED IN U.S.A.

SCPFL   Power Fail

SCRPI   Interrupt In

Pin connections for J4 and J5 on the Signal Sorter, J1 of the System Controller and J5 on the Special Test Equipment shall be identical.

SIZE	CODE IDENT NO.	DRAWING NO.		
A	49956	53959-JK-1002		
SCALE		REV 3	SHEET	61 of 61

10-2703 (6-72) VELLUM   PRINTED IN U.S.A.